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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,494	09/26/2005	Jung-won Kang	29137.004.00	4929

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EXAMINER	
WALTERS JR, ROBERT S	

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
01/05/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/516,494	KANG ET AL.	
	Examiner	Art Unit	
	ROBERT S. WALTERS JR	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 6-10* is/are pending in the application.

4a) Of the above claim(s) *8-10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6 and 7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

Claims 1-3 and 6-10 are pending. Claims 8-10 are withdrawn. Claims 1-3, 6 and 7 are presented for examination.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/10/2009 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 6 and 7 have been considered but are moot in view of the new ground(s) of rejection.

Response to Amendment

The declaration under 37 CFR 1.132 filed 11/16/2009 is insufficient to overcome the rejection of claims 1-3, 6 and 7 based upon Ko in view of Lau as set forth in the last Office action because: the examiner does not agree that the evidence offered shows unexpected results, as the applicant is arguing. The examiner contends that the dielectric constants that are provided

are too similar to support the argument that the selection of applicant's claimed compound provides an unexpectedly beneficial dielectric constant as compared to the comparative examples.

Claim Objections

Claim 1 is objected to because of the following informalities: Claim 1 recites that the polymer has a dielectric constant of less than about 2.21, however it apparently should recite that the film formed from the polymer after removal of the porogen has a dielectric constant of less than about 2.21. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-3, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ko et al. (U.S. PGPUB No. 2001/0055891) in view of Leung et al. (U.S. Pat. No. 6204202).

I. Regarding claims 1, 3 and 6, Ko teaches a organosilicate polymer and a method for preparing an organosilicate polymer by mixing a pore-forming component, which may be a thermally decomposable organic silane compound having formula I, $R^3_pY_{3-p}Si\text{-}M\text{-}SiR^4_qZ_{3-q}$, (see Ko at claim 2 and 0049), and wherein the organic component M is a decomposable organic group (see Ko at example 3, 0049) and a silane compound or oligomer that can have the formula II as is claimed (see 0028,0049 and claim 2) and then adding water and a catalyst to conduct hydrolysis and condensation (0037 and 0049) to form covalent bonds between the two compounds. Ko teaches that the organic substance can be decomposed at 450 °C or less and may be an alkylene or arylene group (see Ko at claim 2 and 0049). Ko fails to teach that the decomposable organic group may be a polyalkyleneoxide. However, Leung teaches a method for forming nanoporous materials having low dielectric constants (abstract), in the range of 1.5 to

about 3.8 (column 10, lines 21-25, note that overlapping ranges are *prima facie* evidence of obviousness) by removal of porogens, wherein the porogens are thermolabile and may be copolymerized with the silicon-based polymer (column 8, lines 15-27 and column 6, line 38). Leung further teaches that preferred thermolabile groups include polyalkyleneoxides (column 9, lines 8-10) having a molecular weight from 200-7500 (column 9, lines 1-7, note that overlapping ranges are *prima facie* evidence of obviousness). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ko's polymer and method by utilizing a polyalkyleneoxide, such as polypropyleneoxide in place of Ko's alkylene or arylene groups, thereby providing access to dielectric films having a dielectric constant of less than about 2.21. One would have been motivated to make this modification to provide access to extremely low dielectric constant films (see Leung at abstract). Furthermore, one would have been motivated to make this modification, as one of ordinary skill in the art at the time of the invention could have made this particular substitution with a reasonable expectation of success (given that Leung is utilizing the polyakyleneoxide for the same purpose that Ko is utilizing the alkylene or arlyene groups, and Leung actually teaches copolymerizing the porogen with the silicon-based polymer, see above), and the predictable result of providing a polymer that can be heated to produce a porous film.

II. Regarding claim 2, Ko teach in view of Leung teach all the limitations of claim 1, but fail to teach the particular compounds as claimed. However, Ko does teach compounds of formula I (see above), where M is an organic group and R^3 and R^4 can be alkyl, while Y and Z can be an alkoxy, where p and q are integers from 0-2 (see Ko at 0049). Leung teaches utilizing

polypropyleneoxide as a thermolabile group (column 9, lines 8-14). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ko in view of Leung's method to utilize bis-methyldimethoxysilylpropyl polypropyleneoxide as the decomposable organic silane. One would have been motivated to make this modification as one of ordinary skill in the art could have substituted this particular compound for the generic compounds taught by the combination of Ko in view of Leung with a reasonable expectation of success. One would have had a reasonable expectation of success, because the compound has two alkoxy groups for cross-linking to form a network polymer and it has the thermolabile organic group that would decompose upon heating to form a porous film. Furthermore, the results of this substitution would be predictable, namely that it would provide a similar organosilicate polymer that can be heated to provide an insulating film.

III. Regarding claim 7, Ko in view of Leung teach all the limitations of the organosilicate polymer of claim 6 (see rejection above) and Ko further teaches a coating composition (see 0049-0050) comprising the organosilicate polymer (see above) and an organic solvent (0050).

2. Claims 1-3, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ko et al. (U.S. PGPUB No. 2001/0055891) in view of Lu et al. (U.S. PGPUB No. 2005/0173803).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

I. Regarding claims 1, 3 and 6, Ko teaches a organosilicate polymer and a method for preparing an organosilicate polymer by mixing a pore-forming component, which may be a thermally decomposable organic silane compound having formula I, $R^3_pY_{3-p}Si\text{-}M\text{-}SiR^4_qZ_{3-q}$, (see Ko at claim 2 and 0049), and wherein the organic component M is a decomposable organic group (see Ko at example 3, 0049) and a silane compound or oligomer that can have the formula II as is claimed (see 0028,0049 and claim 2) and then adding water and a catalyst to conduct hydrolysis and condensation (0037 and 0049) to form covalent bonds between the two compounds. Ko teaches that the organic substance can be decomposed at 450 °C or less and may be an alkylene or arylene group (see Ko at claim 2 and 0049). Ko fails to teach that the decomposable organic group may be a polyalkyleneoxide. However, Lu teaches a method for forming nanoporous materials having low dielectric constants (0021 and 0065), in the range of 1.3 to 3 (0021, note that overlapping ranges are *prima facie* evidence of obviousness) by mixing a thermally decomposable organic group, such as polyalkylene oxide (0059) with a silicon compound of formula 2 (0048-0049). Lu further teaches that preferred decomposable organic groups include polyalkyleneoxides (0059) having a molecular weight from 100-3000 (0058, note that overlapping ranges are *prima facie* evidence of obviousness). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ko's polymer and method by utilizing a polyalkyleneoxide, such as polypropyleneoxide in place of Ko's alkylene or arylene groups, thereby providing access to dielectric films having a dielectric constant of less than about 2.21. One would have been motivated to make this modification to provide access to extremely low dielectric constant films (see Lu at 0021). Furthermore, one

would have been motivated to make this modification, as one of ordinary skill in the art at the time of the invention could have made this particular substitution with a reasonable expectation of success (given that Lu is utilizing the polyakyleneoxide for the same purpose that Ko is utilizing the alkylene or arlyene groups), and the predictable result of providing a polymer that can be heated to produce a porous film.

II. Regarding claim 2, Ko teach in view of Lu teach all the limitations of claim 1, but fail to teach the particular compounds as claimed. However, Ko does teach compounds of formula I (see above), where M is an organic group and R^3 and R^4 can be alkyl, while Y and Z can be an alkoxy, where p and q are integers from 0-2 (see Ko at 0049). Lu teaches utilizing polypropyleneoxide as a thermolabile group (0059). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ko in view of Lu's method to utilize bis-methyldimethoxysilylpropyl polypropyleneoxide as the decomposable organic silane. One would have been motivated to make this modification as one of ordinary skill in the art could have substituted this particular compound for the generic compounds taught by the combination of Ko in view of Lu with a reasonable expectation of success. One would have had a reasonable expectation of success, because the compound has two alkoxy groups for cross-linking to form a network polymer and it has the thermolabile organic group that would decompose upon heating to form a porous film. Furthermore, the results of this substitution would be predictable, namely that it would provide a similar organosilicate polymer that can be heated to provide an insulating film.

III. Regarding claim 7, Ko in view of Lu teach all the limitations of the organosilicate polymer of claim 6 (see rejection above) and Ko further teaches a coating composition (see 0049-0050) comprising the organosilicate polymer (see above) and an organic solvent (0050).

Conclusion

Claims 1-3 and 6-10 are pending.

Claims 8-10 are withdrawn.

Claims 1-3, 6 and 7 are rejected.

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT S. WALTERS JR whose telephone number is (571)270-5351. The examiner can normally be reached on Monday-Friday, 8:00am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ROBERT S. WALTERS JR/
December 30, 2009
Examiner, Art Unit 1792
/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792